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TO: Orr Reynolds, Director
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FROM: Joshua Lederberg
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SUBJ: Preliminary Notes on PLANETLAB Program

Since our conversation the end of last month we have been thinking very hard about the program that will be needed to realize any effective mission in 1975. Every aspect of this is very complicated and we certainly need to give a good deal more attention to our part of the program. Even to do this properly we have had to consider adding to our present staff as soon as possible and have some good leads (but need whatever further advice you can offer).

The main conclusions that emerge even at this stage are these urgencies:

1. Planning for substantial facilities (phase 1) to be ready no later than September, 1970. This entails final design to be under way by September, 1968. It is certainly not too early to start thinking about at least the budgetary planning for this right away. We would want more study before even hazarding an informed guess, but the cost might be anywhere from $10-50 million, depending in part on the intended overlap with the phase 2 facility.

If we get phase 0 underway <u>immediately</u> (and the ARPA award plus current NASA funding gives us at least a little headway), we should have the experience to be able to contribute to the technical planning in September, 1968, and,of course, continue backup thereafter.

2. The importance of a sturdy Mars reconnaissance mission at the 1969 opportunity. This is the latest chance for basic redirection of PLANETLAB strategy. Later sorties can influence engineering detail at one extreme or go/no-go at the other.

Before we say very much more about the expansion of phase 0, we want to make a very detailed study on our own. The general picture that we have is to implement up to about 20 channels of time-shared computer control, about 10 of which would be directly related eventually to Mars oriented experiments. The major purpose of phase 0 is not, however, to verify the configuration of the PLANETLAB but to outline what the main system planning problems are going to be when we have to service large number of experiments simultaneously from the same computer. In that sense the work that we already have going and the additional work which is contemplated under the request that Dr. McCarthy and I have already submitted would constitute some 4 or 5 of the indicated channels. However, until now we have intended to shy away from expensive hardware development at the other end of the line as far as we could except for a few experiments (for example the Pasteur Probe that we have been vitally interested in ourselves).

In addition to the planning for the phase 0 system we are also contemplating going through some additional exercises on our own towards other paper configurations of a PLANETLAB that would help to give more tangibility to the concept. How far we can go on this depends mainly on the people that we can recruit during the next few months.

I will, of course, arrange for the earliest discussions in some detail with Chuck Cline and our other colleagues at various places, and you will hear more about this. I want to assure you of our own recognition of the urgency of the timetable, and if we are still somewhat cagey about the actual responsibilities that we might wish to undertake, it is only that we want to be very sure of what we are offering to get into so that we can deliver on any promises that might be implicit. Needless to say, any tangible developments that would reinforce the possibility of the location of the phase 1 laboratory (in particular in this general vicinity), would lend even more weight behind our own planning that might contribute to it.

Actually the main new thing that we might plan to get into on the premise of a significant expansion of phase 0 effort would be the automation of various "wet chemistry processes" of which amino acid analysis by column chromatography and the snythesis of fluorometric reagents and of other special materials might be rather good examples. The essence of the matter is the timetable, and I include a very simplified sketch which does, after all, contain the meat of the problem.

JL:as

Enclosures